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## **PROJECT: ELECTRICITY TRANSMISSION IMPROVEMENT**

**COUNTRY: KENYA**

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### **ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SUMMARY**

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# ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA)

## SUMMARY

**Project Name:** Electricity Transmission Improvement Project  
**Country:** Kenya  
**Project Number:** P-KE-FAO-004

### 1. Introduction

1.1 While the Ministry of Energy and Kenya Power and Lighting Company (KPLC) have developed a Least Cost Power Development Plan for the period 2008-2028, most recently updated in 2007, efficient and effective electric power transmission still remains a major challenge. It is in this vein that Kenya Electricity Transmission Company (KETRACO) has embarked on a country wide electricity transmission improvement program. This need necessitated the Kenyan Government to prioritize the utilization of proceeds from AfDB into investing in five transmission lines across the country. This Summary, therefore, combines the five lines environmental and social assessments. The lines are (i) Olkaria-Kisii-Sondu; (ii) Nanyuki-Nyahururu-Kabarnet-Lessos; (iii) Ishiara-Kieni-Embu; (iv) Mwingi-Kitui-Sultan Hamud; and (v) Sotik-Bomet. The project of this magnitude is classified as Category one by the AfDB's Environmental and Social Impact Assessment Procedures which requires an environmental and social impact assessment summary to be posted on the AfDB's website for 120 days before the proposal for financing can be submitted to the Bank's Board.

1.2 The Summary, therefore, presents for each line project description and project areas, project justification, policy and legal framework, description of project environments, project alternatives, potential impacts and mitigation/enhancement measures, environmental and social management plan, monitoring program, public consultations and public disclosure, complementary initiatives, conclusion, references and contacts.

### 2. Project Description

2.1 The Kenya Electricity Transmission Improvement Project will consist of construction, on a turnkey basis, of a total of 451 km of 132 kV line and extension of six substation bays and construction of eight new 132/33 kV substations. The 132 kV transmission lines considered under the project financing are 53 km Ishiara – Embu, 65 km Lessos-Kabarnet, 79 km Nanyuki-Nyahururu, 68 km Olkaria-Narok, 33 km Sotik-Bomet and 153 km Mwingi-Kitui-Wote-Sultan Hamud. Eight 132/33 KV new substations will be constructed at Kieni, Kabarnet, Nyahururu, Narok, Bomet, Kitui, Wote and Sultan Hamud with six 132 kV outgoing bays at Ishiara, Lessos, Nanyuki, Olkaria, Sotik and Mwingi.

2.2 The project activities shall include construction of power lines comprised of electrical conductors supported on 27metre high pylons constructed of stainless steel metal; several hundred steel towers (pylons) comprising both angle towers and line towers will be constructed for purposes of mounting the conductors on which the 132kV power supply will be transmitted. The project will require a 30-metre wide Right of Way corridor along the entire routes of traverse implying that over 1500 ha of land will be negotiated for the project. Further, all physical structures and trees growing above 7m height will be removed from the wayleave in line with requirements of the KPLC and KETRACO.

### 3. Description of Project Areas

3.1 The project ESIA and RAP studies combined line sections in various way since the consulting firms were not the same and done at different times. For that matter, the Summary will refer to the following ESIA and RAP reports:

- (i) Olkaria-Narok-Bomet-Sotik, Kisii – Sondu;
- (ii) Nanyuki-Meru, Ishiara-Kieni, Mwingi-Kitui-Wote-Sultan Hamud; and
- (iii) Lessos-Kabarnet-Nyahururu-Nanyuki.

### ***Olkaria-Narok-Bomet-Sotik, Kisii-Sondu***

3.2 The Olkaria-Narok-Bomet-Sotik line section will start opposite the west side of Olkaria- I Geo-thermal Power Station's switchyard, the supply point for the proposed Sub-project which traverses Hell's Gate National Park, through settled areas, shrubs and savanna spanning about 186km. This alignment follows the eastern side of the existing 33kV line to Narok town. This routing avoids creation of a separate and new alignment in accordance with World Bank and IFC recommended practice and lessens environmental impact. This is accessible through the local tracks either from the existing DCK-Narok 33kV line or the many other tracks linking the area's Masai 'manyattas' between Olkaria and the B3 highway Mai Mahiu –Narok. Thereafter, the proposed line will follow the southern side of the B3 highway from Narok to Bomet then to Kaplong and terminates at Sotik. The line will pass through some populated areas, near Bomet town all the way to Sotik although to a larger extent, it will pass through Shrubland and savanna grasslands used for ranching, grazing purposes and wheat farming between Olkaria and Narok.

3.3 Bomet-Sotik line again selected on the basis of it following the southern side of the B3 highway to Kaplong and then Sotik which is approximately 34km from Bomet town. The land cover is mainly characterized by woodland and Savannah grass land mix. Some trees identified are Eucalyptus, Pines and Grevillea Robusta. Small holding/farms are practiced with maize and wheat being the major crops and some livestock/ cattle farming. The area is mostly hilly with series of ridges dominant in this area. It crosses the Sisei River some 8 km before AP 122 and again some 4 km before Sotik. This region is mainly inhabited by the Kipsigis community who are currently practicing farming and they are famously known for growing Kenyan "green gold" - tea.

3.4 Kisii-Sondu Line: The Kisii-Sondu transmission line traverses through settled areas, shrubs spanning about 46km. The transmission line will end at Kegati substation in Kisii from the Sondu Miriu Power station.

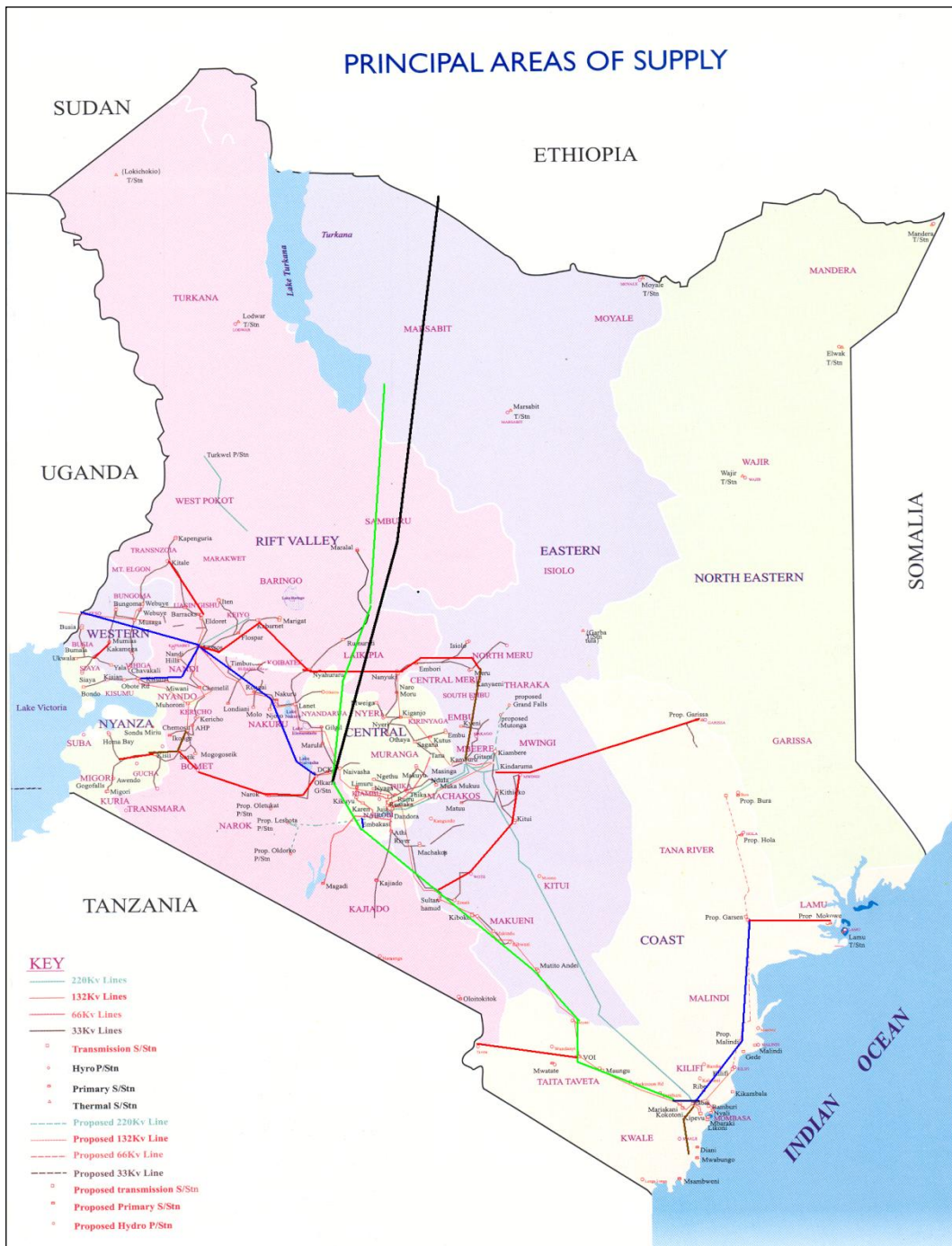
### ***Nanyuki-Meru, Ishiara-Kieni, Mwingi – Kitui – Wote – Sultan Hamud***

3.5 The project entails development of 264 kilometres of 132 kV transmission lines connecting Nanyuki-Meru, Ishiara-Kieni and Mwingi-Kitui-Wote-Sultan Hamud. The project starts at the boundary of the Rift Valley Province at Nanyuki in Laikipia East District and traverses a total of 14 Eastern Province Districts to end at Sultan Hamud town on the boundary of Rift Valley Province.

### ***Lessos-Kabarnet-Nyahururu-Nanyuki***

3.6 Lessos - Karbanet – Nyahururu – Nanyuki line starts at Lessos going through Keiyo. The proposed 132KV transmission line starts the current substation at Lessos, eastward into Terige area of Kesses District which is a sparsely populated area. This is predominantly an agricultural area and the terrain is generally flat with valleys such as Tulwet valley. The line passes through the districts of Nandi, Uasin-Gishu, Keiyo, Baringo and Laikipia.

Map of Project Area



#### 4. Project Justification

4.1 An immediate justification of the project comes in that it will stabilize power supply and thus cushion current consumers against losses occasioned by power failures and blackouts. As well, expansion of power supply will improve access by new consumers and thus facilitate investments hitherto constrained by lack of electric. Having said that the project is key to Kenya's development agenda since it would allow increased electricity access rates, reduced power losses, increased supply capacity and increased reliability of power supply in the regions. The project is consistent with the socio-economic development policy of Kenya which seeks to improve the living conditions of the population in the country and the

achievement of the Millennium Development Goals (MDG) as it will result in improved reliability of the power system as a result of strengthening of the transmission system, and provide stable access to affordable power in rural areas in so doing contribute towards improving the quality of life for women and children through time saving on gathering firewood and through increased employment opportunities.

4.2 In order to achieve the above objectives and sustain growth rates of between 7% and 10% over the next 25 years, strategies to enhance customer growth were initiated under the Energy Sector Recovery Project (ESRP) and the Rural Electrification Programme. The number of customers increased from 802,249 in 2005/06 to 924,520 2006/07, a growth of 12.3% compared to 7.7% in 2005/06. Customers under the Rural Electrification Programme (REP) increased by 22,323 to 133,047 in 2006/07, representing a 20% growth from the previous year. KPLC sales increased by 8.7% while REP sales increased by 33.9%. The power sector targets to grow the customer base by 200,000 annually in the next five years resulting in increased power demand.

4.3 The rapidly growing demand also necessitated installation of emergency measures and pursuit of committed short term projects. KenGen and other generators are expected to supply an additional 875 MW capacity by 2015. Furthermore, intensive measures have been implemented through the system improvement work under the ESRP and KPLC's own targets to considerably reduce outages which are expected to enhance both peak demand and consumption. The Kenya Government has therefore included in the scale up program a component of extending 132 kV transmission lines and associated substations to priority areas in order to reduce the current high energy losses caused by the overloading of the system. The Bank's participation in this project is therefore critical to ensuring that Kenya is able to build and enhance the transmission and distribution infrastructure thereby increasing access to electricity in rural areas of western and eastern Kenya. This project will therefore add to the gains attained in customer connection and network expansion through the intensive Rural Electrification Programme and KPLC accelerated customer connection campaign.

## **5. Policy, Legal and Administrative Framework**

5.1 In anticipation by the Government of Kenya to receiving financing from World Bank to finance the project, the conduct of the studies was guided by the World Bank policies and guidelines and those of the Kenyan Government, the National Environment and Management Authority (NEMA) as stated in The Environmental Management and Coordination Act (EMCA) 1999, and stipulated in the Environmental (Impact Assessment and Audit) Regulations 2003 Legal Notice No. 101., which are largely consistent with those of the AfDB. Kenya has approximately 77 statutes which relate to environmental concerns. Most of these statutes are sector specific, covering issues such as public health; soil erosion; protected areas; endangered species; water rights and water quality; air quality, noise and vibration; cultural, historical, scientific and archaeological sites; land use; resettlement; etc.

5.2 With the enactment of the Environmental Management and Co-ordination Bill in December 1999, the institutional framework for environmental management was strengthened. The Environmental Management and Co-ordination Act (EMCA) of 1999 provided for the establishment of a National Environment Management Authority (NEMA), which became operational in July 2002, with the statutory mandate to co-ordinate all environmental activities. The comprehensive framework for environmental assessment provided by EMCA and now adopted by all sectors ensures that Kenyan processes for environmental and social assessment are consistent with World Bank safeguard policies. While NEMA is entirely responsible for the coordination of sectoral environmental issues, Ministry of Energy, Energy Regulatory Commission and the implementing agencies KETRACO and KPLC must ensure that environmental and social impact assessments for the electric transmission projects are adequately carried out, that mitigation is incorporated as appropriate, and that the construction process is environmentally and legally compliant.

5.3 Existing sectoral laws and regulations applicable to environmental and social management and that are likely to be triggered by the proposed construction of the five lines are:

- The Constitution of Kenya
- Kenya Wildlife Service Policy Framework for 1991-1996 (Zebra Book)
- The Environmental (Impact Assessment and Audit) Regulations, 2003
- Environmental Management and Co-ordination (Waste Management) Regulations 2006
- Environmental Management and Coordination, (Water Quality) Regulations 2006
- Conservation of Biological Diversity (BD) Regulations 2006
- The Occupational Safety and Health Act 2007
- The Water Act 2002
- The Wildlife (Conservation and Management) Act (Cap 376)
- The Forests Act 2005
- Government Lands Act, Cap. 280 (revised 1984)
- Trust Lands Act Cap. 288 of 1962 (revised 1970)
- Local Government Act, Cap. 265 (revised 1986)
- The Land Adjudication Act, Cap. 284 of 1968 (revised 1977)
- The Land Adjudication (Amendment) Bill of 1999
- The Land (Group Representatives) Act (Cap. 287) of 1968 (revised 1970)
- Registered Lands Act, Cap. 300 of 1963 (revised 1989)
- Land Planning Act, Cap. 303
- The Physical Planning Act (Cap 286)
- The Land Acquisition Act Cap 295/288
- Registration of Titles Act (Cap. 281),
- Land Titles Act, (Cap. 282),
- Land Consolidation Act (Cap. 283),
- Land (Perpetual Succession) Act (Cap. 286),
- Mazrui Lands Trust Act (Cap. 289),
- Land Control Act (Cap. 302)

5.4 With regard to the compensation and resettlement issues, the main pieces of legislation are the Constitution of Kenya and the various legislation pertaining to land tenure. In this regard, the main prime participants are the KPLC (the Lead Agency), KETRACO (Project Proponents), Ministry of Lands (compensation and valuation), NEMA (implementation of the ESMP) and KWS and KFS (monitoring of protected areas).

5.5 KPLC's Resettlement/Land Acquisition Framework requires that:

- i. Relocation and compensation arrangements will be designed to limit social disruption and assist those who have lost assets as a result of the project to maintain their livelihoods. In accordance with Kenyan laws and standards, a disturbance allowance is to be provided to assist the project affected individual or family to cover costs of moving and relocating to a new holding.
- ii. Detailed consultation and disclosure process has to be carried out to ensure that all stakeholders are involved in the RAP process.

## **6. Description of the Project Environment**

### ***Olkaria-Narok-Bomet-Sotik-Bomet, Kisii***

**6.1 Topography:** Narok District is one of eighteen districts in the Rift Valley Province and covers an area of 15,097.8 square kilometres. Bomet district generally has a hilly topography and the Mau forest. The district is one of the places in the country that receives the highest annual rainfall. Sotik district has an average elevation of 1827 meters. The topographic and climatic characteristics of the Olkaria-Narok-Bomet-Sotik can broadly be divided into two: the highlands and the lowlands with the highlands having an altitude ranging from approximately 3,000 metres above sea level while the lowlands range between 1,000 to 1,400 meters above sea level. Rivers in the district drain towards the south. The major rivers are Ewaso Ng'iro and its tributaries Siapei and Narok. Two thirds of the district is semi-arid. The highlands have rich volcanic soils suitable for intensive agricultural production and receive reliable rainfall ranging from 1200mm-1800mm. The lowlands where the altitude ranges from 1400-1800 metres above sea level have high potential for livestock rearing. Nomadic pastoralist and small-scale subsistence cultivators inhabit the lowland areas. The rains are unreliable. Mean temperatures range from 5° C in July to 28° C in December to February. The coldest months are July and August with monthly temperatures of 17.6°C and 19.8°C respectively.

**6.2 Soils:** The lowland areas of Narok which cover Ololulunga, Mara, Loita and Osupuku Divisions, have poor quality soils unlike the highlands where soils are fertile. The soils in Bomet district are generally fertile with altitude, temperatures and rainfall as the main determinant of farming practices in each area. Clay soil which covers 43.6 per cent of the district does not allow water to percolate easily. The soils in Sotik area can be classified as latosols i.e. dark red clay loam and in other areas black Cotton soils. These soils are rich in plant nutrients and can accommodate production of varied kind of Agricultural crops due to being rich in availability of nutrients and good water holding capacities.

### **Biological Environment**

**6.3 Vegetation:** The vegetation at Hell's Gate National park is mainly grasslands and shrublands dominated by several species of Acacia and Euphorbia. There are also a wide variety of succulents in the area and some unique plants capable of withstanding high temperatures. Narok district has abundant natural forest resources with a total area of 724 square kilometres of gazetted, 930 square kilometres of non-gazetted and 480 sq. km of trust land forests respectively. The forest mainly provides timber, fuel wood, fodder for animals and fruits and other products for local consumption. The gazetted forest within Bomet district is Chepalungu Forest with an area of 30.041 Km<sup>2</sup>. The vegetation cover is generally green throughout the year. It is, therefore, an agricultural district with tea cultivation and dairy production dominating the agricultural activities. In Kisii and Sondu there are mainly dense small/medium agricultural holdings interspersed with trees (acacia species, Eucalyptus and Grevillea robusta).

**6.4 Wildlife:** There are over 103 species of birds in the Hell's Gate park, including vultures, Verreaux's Eagles, Augur Buzzard, eagles and swifts. The dominant animals along the route are Hyraxes, African buffalo, zebra, eland, hartebeest, Thomson's gazelle, and baboons, and giraffes. Some of the animals like Zebras and gazelles were spotted outside the park. It is expected that most of the large mammals can nowadays be found inside the protected areas. The area traversed by the Kisii-Sondu Line does not have wildlife because it is densely populated with people practicing intensive agriculture.

**6.5 Socio Characteristics:** A number of ethnic groups reside along the planned power line route. The main ethnic groups in the project area are the Maasai, Kipsigis, Gusii, and Luos. Despite education, civilization and western cultural influence, the Maasai people, unlike other tribes of Kenya have clung to their traditions and way of life making them a symbol of Kenyan culture. The Maasai ear their livelihood mainly from pastoralism which is embedded in their culture. Kipsigis are a sub-group of the Kalenjin and originated in the Sudan with current settlements in the Rift Valley province of Kenya. They occupy the highlands of Kericho stretching from Timboroa to Mara River, Mau Escarpment, and Kebeneti. To the north-east, other Kalenjin people are found, mainly the Nandi. The predominant occupation is farming mainly growing tea. The Kisii are regarded as one of the most economically active communities in Kenya growing tea, coffee, and banana groves. The Luo (also called Jalu), are an ethnic group in Kenya, eastern Uganda, and northern Tanzania. The Luo are the third largest ethnic group (13%) in Kenya, after the Kikuyu (22%) and the Luhya (14%). The traditional occupation of the Luo is fishing, though many are also farmers or formal jobs in the larger cities. They speak the Dholuo language, which belongs to the Western Nilotic branch of the Nilo-Saharan language family spoken by other Luospeaking peoples such as the Lango, Acholi, Padhola and Alur (all of Uganda).

**6.6 Economic Characteristics:** The majority of the populations affected are pastoralists, large scale farmers, subsistence farmers, small and medium business operators and people in formal and informal employment. Regarding land use, the proposed transmission line routes traverse various districts which includes: Narok North, Narok South, Ololunga, Bomet, Sotik, Kisii Central, Nyamira, Rachuonyo South, and South Rachuonyo. The main ethnic groups along the Olkaria to Sotik line comprise the Maasai and the Kipsigis while along the Kisii to Sondu comprises mainly the Kisii and the Luo ethnic groups. The majority of the people in the affected area are dependent upon land and livestock as the basis of socio economic subsistence.

**6.7** As shown from the figure, crop farming accounts for 52.7% of the agricultural activities while livestock rearing takes 46.8%. Most of the crops grown include maize, beans, millet, sorghum, potatoes, bananas, avocado, coffee, tea, sugar cane in the Kisii-Sondu areas while wheat, potatoes, beans and other cereals are grown in the Narok region. The majority of farmers pursue rain-fed agriculture. Cultivation practices have generally shaped the settlement profile. Most of the areas where small-scale subsistence farming is the predominant agricultural practice farmers tend to be located on their properties. Where roadside villages occur, families tend to take advantage of commercial opportunities presented through the traffic by establishing small kiosks and other income generating activities.

#### ***Nanyuki-Meru, Ishiara-Kieni, Mwing-Kitui-Wote-Sultan Hamud***

**6.8 Bio-physical setting:** Relief of the routes of traverse generally ranges from around 1040m above sea level in the Kitui area to over 2000m above sea level at the base of Mt.

Kenya in Meru. With the exception of sections in Nzau, Migwani and Mbeere districts, the terrain of to be traversed by the Project is generally flat and undulating.

6.9 Geomorphology of the project area ranges from volcanic foot-ridge and foot-slopes at the base of Mt. Kenya slowly graduating to the volcanic lava outflow of the Yatta plateau which is heavily dissected by the Athi River and tributaries, notably the Thwake. Across the Thwake River in Makueni, the dominant geomorphic features are remnant basement complex hills as typified by the Nzau which outcrop from the generally undulating local terrain. Predominant soils are greyish sandy clay loam to clay, and heavy clays; along the Yatta plateau and other volcanic belts that soils display high variability in depth, texture and reaction and underlain by lithic phases and granite. The proposed transmission lines traverse three drainage basins namely; - Ewaso Ngiro, Tana and Athi. Main drainage lines traversed include: Nanyuki, Likii, Sirimon, Timau, Ena, Thuchi, Tana, Tiva, Whita Syano, Athi, Thwake, Kaiti among others.

6.10 Climate varies greatly within the routes of traverse with rainfall being highest at Meru and Kieni both of which enjoy an easterly exposure on the base of Mt. Kenya which secures relatively higher humidity. In the lowlands of the greater Kitui and Machakos districts, rainfalls are low with Wote recording an annual low of 565 mm.

6.11 The vegetation cover in the arid sections traversed by the project largely comprises of indigenous trees and shrubs dominated by Acacias, yellow wood, combretum, etc while that within the humid belt has been largely substituted with exotic trees dominated by grevillea, casuarinas, blue gums, cassia siamea, neem etc all of which grow to heights generally above 8 metres.

6.12 Vegetation cover in the arid and semi-arid land (ASAL) sections of the Routes of traverse: ASAL vegetation is usually delicate on account of inherently poor capacity for regeneration which possibly explains the observed declining cover on account of exploitation for charcoal making, wood carving, building and fencing materials, clearing for crop production and pastures, cutting for building and fencing among others. The proposed clearing of ASAL woody vegetation base to give way to the ROW will take place against this worrying background.

**6.13 Socio-cultural setting:** At the start of the project, the Nanyuki –Meru Section of the transmission lines traverse peri-urban Nanyuki which is largely cosmopolitan then passes through farms owned by Kenyans of European descent. All other Sections of the project up to Sultan Hamud traverse largely rural settlements dominated by the Meru, Mbeere, Embu and Akamba peoples respectively. Highest population densities in excess of 400 persons per square kilometre are encountered within the humid Kieni /Runyenjes section of the project, with the lowest occurring in the Yatta plateau section of Kitui District. Within the section between Wote and Sultan Hamud, moderately high densities in the range of 200 persons per square kilometre will be found. With the exception of the Nanyuki/Timau area where a few large-scale farms are found, the project largely traverses small holder settlements where small scale mixed farming is the main economic mainstay.

**6.14 Economically sensitive resources:**

**Land:** Land is just about the most important and widely coveted resource in Kenya, access to which is a pre-requisite to economic production, settlement through ownership of shelter, and it offers security in old age and upon eventual death; all of which account for the huge interest that vests in land within Kenya. Against this background, the requirement for land to

be set aside for construction of the proposed transmission lines is likely to have major impacts within the routes of traverse.

**Private and public investments:** Many private and public investments;- buildings, institutions, trees, developed farms etc will be traversed by the project with the prospect that quite a number will be cleared out of the Right of Way corridor and measures must be put in place to insure against retrogressive impacts of infrastructure.

**Existing infrastructure:** Along the entire routes of traverse, diverse infrastructure is encountered as follows:-diverse power transmission lines (132kV lines at Nanyuki, Kitui and Sultan Hamud, widely occurring low voltage power transmission and distribution lines), the Military Air base and airport at Nanyuki, the sewage treatment lagoons at Nanyuki, the airstrip at Kitui, among others. Together with local roads and water supply lines, these resources are economically and strategically crucial hence the need to flag them to ensure planning for their mutual co-existence and harmony on the side of the proposed development.

### **Lessos-Kabarnet-Nyahururu-Nanyuki**

**6.15 Topography, Soil and Climatic conditions:** The physiographic nature of Nandi dist is the rolling hills, Kapsabet Plateau, highlands and foothills of Tinderet volcanic mass, the Kingwal Swamp; and the dissected Nyando Escarpment. The district has an altitude of between 1300 and 2500 meters above sea level (asl). The district has a cool and moderately wet climate with an average rainfall of between 1200mm and 2000mm per annum. Uasin Gishu district is a highland plateau. Its terrain varies greatly with an altitude of between 1,500m and 2100 asl. The district has undulating plateau with no significant mountains or valleys with annual average rainfall of about 900mm. Temperatures range between 8.8° and 25 ° C. Keiyo District has the highland plateau, the Elgeyo Escarpments, and the Kerio Valley. The highland plateau rises gradually from an altitude of 2,400m to 2,700m asl. It has an average rainfall of 1500mm. Baringo district has an average rainfall ranging between 600mm in the lowlands to 1000-1500mm in the highlands, with temperature ranging between 16-18°C and 25-30 °C, respectively. Laikipia district experiences a relief type of rainfall due to its altitude and location which ranges between 400mm and 750mm. Land use in the said districts varies from land for residential, settlements, farming for cash and food crops, livestock grazing, large plantations for sugarcane, sunflower, coffee, tea, wheat, etc., forested areas,

**6.16 Drainage and Hydrology:** Nandi district has seven major rivers, namely Anapingetuny, Kapchorua, Kimondi, Yala, Mokong, Kabutie, and Clare. All these rivers originate from the district except Rivers Anapingetuny and Kimondi. There are also other permanent streams spread all over the district, but with concentration in central and southern divisions of Aldai, Tinderet, Nandi Hills, Kilibwoni, Kaptuma and Kapsabet. Uasin Gishu has mainly two rivers, Nzoia and Sosiani. Keiyo district has its natural water source from Kerio River which has its numerous tributaries emanating from Metkei, Tenges and Kimwarer Hills. The tributaries include seasonal rivers of Torok, Kessup and Emsoo. Main rivers in Baringo district are Pekerra, Molo, Kerio, Lobo, Suguta, Ol-Arabel and Waseges. In addition, there are lakes such as Baringo. Laikipia has two swamps namely Marura and the Ewaso Narok.

**6.17 Forest Diversity:** There are 6 gazetted forest reserves in Nandi District, covering an area of about 54,487.4 hectares. The largest reserves are North Nandi Forest, North Tinderet Forest and South Nandi Forest. Uasin Gishu District Forestry is the second most important activity after agriculture in the district covering approximately 31,496ha. Forests in Keiyo District occupy 28,000 hectares, managed by the Ministry of Forestry. The forests are utilized for commercial timber and also serve as water catchment areas. Baringo District has

a forest cover of 24,346.9 ha. Most of the gazetted forests are in highlands, where they are threatened by encroachment due to the high demand for agricultural land. Laikipia District has gazetted forests totaling 58,000 ha. Comprising both indigenous (mukogodo) and exotic (marmant) plantation forests for industrial purposes.

**6.18 Socio-Economic Settings:** Nandi District has a population of about 676,784 mainly concentrated in Kapsabet, Aldai and Nandi Hills. The district has 56 health facilities. Uasin Gishu district has a population of about 693,882 concentrated around the Eldoret town. Kiyo District has a population of about 188,253 found mainly along the major highway and within shopping centres. The District has a large number of modern medical facilities which are well distributed within the district. Baringo District's settlement patterns are mainly determined by climatic conditions that also govern the type of economic activities undertaken. Areas with extensive agricultural activities such as Kabarnet, Kabartonjo, Sacho and Tenges have the highest population densities. Similarly, Laikipia District's settlement pattern is dictated by the potentiality of land, land use system and availability of water. The population density is increasing as a result of immigration and was expected to reach a density of 47 persons per square km by the end of the 2002-2008 district plan period. HIV/AIDS is of particular concern in Laikipia District given the fact that it stretches the already inadequate health facilities beyond their limits. Over 20% of all hospital beds are occupied by HIV/AIDS patients and it is estimated that 30,000 people are infected with HIV/AIDS while the district prevalence rates stands at 10%.

## 7. Project Alternatives

7.1 Various options were considered in each of the line sections. The first analysis done was the *No Project option*. This option implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will however, involve several losses both to the proponent, government and the society as a whole. The *No Project Option* is the least preferred from the socio-economic and partly environmental perspective due to the following factors: there will be no added values to the economy; the proponent will not benefit from the revenue expected from the facilities; the government treasury will not benefit from the revenue to be earned due to the establishment of the proposed project; the economic status of the Kenyans and the local people would remain unchanged; the local skills would remain under utilized; no employment opportunities will be created for thousands of Kenyans who will work in the project; and discouragement for investors. From the analysis above, it becomes apparent that the *No Project Option*.

7.2 Other options considered were on the selection of the routes of traverse which was guided by technical criteria as follows:-

- The need to minimize line length and angle points.
- Avoid steep terrain and areas with landslide risk.
- Avoid marshes and areas with seasonal flooding.
- Avoid areas with rivers and rough terrain between access roads and corridor.

7.3 Further, environmental, resettlement and land compensation aspects have been taken into consideration in an effort to minimize negative visual from exposed towers and corridors through dense forest, avoid heavily urbanized areas, airports and airport approach roads, national defense property and; avoid national parks, ecological or biosphere reserves and protected areas in general.

### **Alternative generation sources**

7.4 Alternatives to energy generation from fossil fuels include hydro- and geothermal power generation and wind generation. Geothermal energy will largely be transmitted through these lines. There is already a 121 MW geothermal power plant at Olkaria 75 km north west of Nairobi, and there is said to be a capacity for 3000 MW of geothermal power in Kenya. Increased geothermal capacity may be interesting, but is much more costly than installing fossil fuelled plants. In addition, there are plans afoot to construct several large wind farms in Kenya. A project of a 50-MW wind farm in Ngong Hills near Nairobi is in the planning stage, and a large project in the northern part of the country is under discussion, one of the most significant ones being that at lake Turkana. However, wind power is less useful for base load, and including it in a major way in the interconnected grid would mainly serve to economize on water and fuel in other power plants.

## **8. Potential Impacts and Mitigation/Enhancement Measures**

8.1 Power transmission lines characteristically generate impacts such as acquisition and maintenance of the right of way, clearing of vegetation from sites and line corridor; construction of access roads, tower pads, and substations are the most obvious sources of construction-related impacts. The area of immediate impact will be the Line corridor Right-of-way (ROW) which will be 30m in width by the total length of all the five lines. Parallel strips of land through those sections of the route which pass through vegetation will also be completely cleared of all trees, scrub and undergrowth above a height of 150mm during the construction stage. Appropriate clearance between conductors and vegetation/structures along this corridor will be maintained throughout the life of the transmission line. Cropping and grazing beneath the conductors is normally permitted. The construction phase is the period where most disturbances to the environment will occur. However, it should be noted that both positive and negative impacts will occur due to implementation of the project. Broadly, key impacts of the development are likely to include:

### ***Potential Positive Impacts***

8.2 ***Employment Opportunities:*** Employment opportunities will be offered to the construction workers and any other persons who will be hired to provide her/his services during the construction phase. In addition, there will arise, opportunities for establishing shops and engaging in income generating activities especially for women.

8.3 ***Additional Power Capacity:*** With the additional substations and power lines, The Kenya Power and Lighting Company limited will be able to increase its electric power reliability and power supply capacity. This additional capacity would have a positive impact on the meeting power demands across the areas since KPLC would be able to supply more electric power which cannot be supported by the existing 33kV line.

### ***Potential Negative Impacts***

8.4 ***Impacts to Agricultural Land:*** Transmission lines will affect farm operations and increase costs for the farm operator. There will be some destruction to farmland especially during construction of tower pads and stringing. Though these will be temporary, tree crops will be affected as they may not be permitted to grow beyond certain heights (12 feet). This is a concern especially along sections where residents have small pieces of land. For many transmission lines, KPLC/KETRACO should repair much of the damage that can occur during construction and provide monetary compensation for damages that cannot be easily repaired. The compensation is extensively described in the RAP. Effort should also be made to ensure that some of the access roads required during project implementation do not become permanent nor leads to dumping sites.

**8.5 Impacts on Drainage, Surface Waters and Water Resources:** Where the area is characterized by many rivers, construction of towers may interfere with the natural drainage systems and modify flow of surface water, and these changes can contribute to soil erosion, flooding, channel modification, downstream scouring and sedimentation in streams and other drainage channels. Siting of towers away from drainage lines and floodways can minimize interference to natural drainage systems. No water will be used for technological purposes. The over head transmission line (OHTL) route crosses some few rivers. The towers will be placed so as to leave a protection zone of 15 m when crossing rivers and streams with the span ranging of 10-15 m, and 5 m when crossing any drainage channels. There will be no wastewaters from construction process because construction workers will be staying at the nearest shopping centers along the proposed lines.

**8.6 Potential Aesthetic Impacts:** The overall aesthetic effect of a transmission line is likely to be negative to most people, especially where proposed lines would cross natural landscapes. Landowners may find transmission lines bordering their property particularly disruptive to scenic views. To some, new transmission lines may be viewed in a positive light because it represents economic development. The proposed development will have minimal effects on the landscape. The OHTL routes have been established so as to meet the co-inhabitancy requirements imposed by the natural landscape, objects, buildings, and facilities in the neighbourhood, assuring they are framing into the existing landscapes and with impacts on as limited land areas as possible.

**8.7 Electric and Magnetic Fields:** Electric overhead lines are considered a source of power frequency, electric and magnetic fields, which may have a perceived health effect. The strength of both electric and magnetic fields is a function of the voltage, distance from the conductors to the ground and the lateral distance from the line to the receptor. However, the EMF decrease very rapidly with distance from source and there should be no potential health risks for people living outside the 30 m wide way leave corridor. Regarding vibration, the design will install anti-vibrating devices over the entire OHTL length to damp vibration caused by the conductors exposed to the dynamic load of wind.

**8.8 Impacts on Natural Vegetation:** The proposed transmission lines will pass through a variety of terrains, where savannah with scattered trees and shrubs dominate. They will also pass through farms and small pieces of land used for cultivation. These pieces of land have different types of exotic trees such as Eucalyptus, Grevellia Robusta and Pine trees. While impact on woody vegetation is going to be permanent, impact on grasses and herbs is mostly transient. In order to minimize the environmental impacts, it is recommended that clearing is done manually as much as possible with no burning of the cleared vegetation. It is important to reiterate that, vegetation clearance through the Protected Areas will be done with the guidance of KWS and KFS staff.

**8.9 Impact on Flora and Fauna:** There is potential that the transmission lines will induce physical hazard to birds and climbing animals and people. Bird strikes and mortality will be of concern in the areas of their high densities and those areas with large birds such as waterfowl colonies and migratory bird species. In areas of known bird flight paths (such as at Bogoria and Baringo) this is likely to be of concern during the operation stage of the project. Never-the-less, the project will mitigate by use of reflectory conductor wire types which improve visibility for the birds and bird warning spheres such as colored balloons will be placed on the OHTL in such potential areas. The design will also include building raptor platforms on top of pylons for roosting and nesting; and include collection of monitoring data on avifauna electrocuted along the proposed transmission lines. In the project design every steel tower and pole will have a danger sign and an anti-climbing barbed wire for the safety purposes. A safety officer will be at the construction site during the construction phase, at all times. The safety officer will make sure a first aid kit is always available and that the skilled

workers are aware of the safety rules. A safety campaign along the transmission alignments should be conducted with local population.

**8.10 Land Excavation, Access Roads and Campsites:** The construction of access roads will potentially impact the environment through vegetation clearance and compaction of land and a permanent loss of land. In order to minimize the impact, the transmission lines are constructed near existing roads or line corridors. Provided temporary access roads are rehabilitated and existing roads/tracks are used for access to minimize the number of new roads required, the impact is not expected to be significant. Camp sites and workshops will have to be located according to local physical plans and constructed in such a way that they can have residual values like turning them into schools and other public facilities.

**8.11 Soil Erosion:** The building of foundations for transmission line towers can potentially exacerbate soil erosion. In addition to the loss of productive land due to soil erosion and land acquisition for tower construction, soils can be impacted as a result of disposal of waste materials, and compaction with heavy machinery used for the establishment of towers and the transmission line. These impacts can be managed by restricting the use of heavy machinery and vehicles to designated work areas and installing soil protection works in areas sensitive to erosion prior to construction.

**8.12 Noise, Ozone and Corona:** During the construction, there is the potential for permissible/acceptable human noise levels that may be temporarily exceeded due to the operation of lorries and equipment in the working zone of the OHTL site. Noise abatement measures will be taken in the zones crossing the residential areas, including agreed upon work scheduling. Corona or electrical discharges may occur on a humid night or during rainfall and can produce noise and ozone. Both the noise levels and ozone concentrations around power lines have no health consequences and are of localized impacts.

**8.13 Social Impacts:**

(i) Settlements and Community Facilities: In order to clear the wayleave, loss of residential houses and private buildings will be one of the causes of negative impacts. Some of the social structures affected by the project include dispensaries, schools, administrative blocks, prayer houses, water sources and commercial buildings. Where it is not possible to realign the line route, compensation and assistance shall be provided to compensate for land and assets, logistical provision for resettling the people, and compensating the people in terms of earnings (loss of current earnings). Details of the resettlement and compensation programs are summarized in the attachment below.

(ii) Fragmenting cultivated lands thereby compromising productivity and incomes, loss of crops, fruit trees and grazing land. In most cases loss of cultivation land will be a temporary impact which will have to be compensated for in financial losses. For trees that grow beyond the 12 ft height similar compensation in cash will have to be made. Otherwise the population will be permitted to grow crops under the lines during operation and continue with grazing.

(iii) Substance (alcohol and drugs) abuse and spread of HIV/AIDS/STI and other Communicable diseases are of concern. Use of alcohol and illicit drugs among the working crew may affect the local population negatively through increased violence and abuse of local women. There will also be an increased risk of the spread of sexually transmitted diseases such as HIV/AIDS/STI in the project area. Intensive campaign of awareness, prevention and treatment shall be part of the project for contract workers and the communities living in the vicinity of the project. Sensitization and education campaigns against abuse will also be part of the mitigation measures under the project.

(iv) Other health issues: Influx of workers from outside communities brings risk of spreading communicable diseases such as waterborne diseases like diarrheal. The control building for equipment and control facility will be supplied with portable water and shall have sanitation and wastewater facility.

**8.14 Archaeological and Historical Sites Impacts:** Archaeological, historical and cultural sites (including cemeteries) are protected resources. They are important and increasingly rare tools for learning about the past. Negative impacts may arise from damage caused by construction and maintenance work through digging, crushing by heavy equipment, uprooting trees, exposing sites to erosion or the elements, or by making the sites more accessible to vandals. No such findings have been reported in the study reports expect for graves. In the event that an archaeological resource is discovered during the construction process, a Chance Find Procedure as described in Performance Standard 8 of IFC will be implemented. The procedure includes record keeping and expert verification procedures, chain of custody instructions for movable finds, and clear criteria for potential temporary work stoppages that could be required for rapid disposition of issues related to the finds.

**8.15 Solid Waste:** The project doesn't envisage major excavation works, thus, the solid waste will be minimal. Solid topsoil wastes from the sites will be the main form of solid waste. Some of the excavated soil will be reused as backfill while the rest will be disposed off to the designated areas. Other solid wastes will include metallic pieces, wooden planks, and stone debris. All these wastes will be disposed off according to the legislation guiding the same. Particular care will be taken in forest reserves and national parks where any materials and plants brought in during construction shall have to be taken out.

**8.16 Impact on Ambient Air:** The air emissions from construction machinery and traffic will be minor and will have negligible impact on ambient air quality.

**8.17 Safety Issues:**

(i) During the construction phase, the work will involve the use of sharp objects, noisy machineries and dusty environment. The constructors will be required to provide workers with the relevant protective gear like boots, gloves, protective clothing dust masks and earmuffs.

(ii) Falling from heights: The nature of the work shall make it unavoidable to climb towers during construction and operation. This brings in the risk of falling from heights. Among mitigation measures shall be ensuring that workers are free from any influence of alcohol or drugs; testing structures for integrity prior to undertaking work; implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures; and inspection, maintenance, and replacement of fall protection equipment.

(iii) Since the proposed lines pass through settled areas, the danger might occur where holes are dug and left uncovered and people and animals falling into them. This can be avoided by covering tower holes and pole holes immediately after digging them and especially at night and providing visible warning signs and barriers when not covered.

**8.18 Impacts on Aviation and Communication:** Airplane flight paths in and near airports and low-flying aircrafts will be affected such as that at Itembe in Bomet District and other several areas in the project. Aircraft navigation and communication facilities may be affected by the project. A survey was performed by the Kenya Civil Aviation Authority, which proposed a restriction on the height of towers, which should not exceed 35 m for any of the line within airport area. The design shall, therefore, ensure routes of the transmission lines are within the safety zone of aircrafts, and encourage the use of special low-profile

structures; or install lights or aircraft warning spheres and other attention-getting devices on the conductors in line with conditions of the KCAA .

## 9. Environmental and Social Management Plan

9.1 An Environmental and Social Management Plan (ESMP) has subsequently been developed for each transmission line. The ESMPs provide general outlay of the environmental and social aspects, potential impacts, mitigation measures, performance indicators, monitoring means and frequency, responsibility for monitoring and associated [estimate] costs. The responsibility for the incorporation of mitigation measures for the project implementation lies with the Supervising Engineers, who must ensure that the Contractors implement all specified mitigation measures. In order for the Contractors to carry out environmental management activities during construction, the Contractors should draw up environmental and social management plans of their own to show how they will address the mitigation measures during the construction period. The Supervising Engineer is responsible for assessing the Contractors' environmental and social management plans and level and competence of the designated staff. This will be done in collaboration with local environmental authorities (e.g., District Councils and Village Development Committees); monitoring the implementation of the ESMP and the civil works contracts will be in collaboration with NEMA; and, preparing annual environmental progress reports. Implementation of the RAP will primarily be the responsibility of KPLC and KETRACO. KETRACO is responsible for ensuring that adequate budget has been provided and that all project affected persons have been fully resettled and compensated before construction starts.

9.2 KPLC will be responsible for reviewing civil works contracts in accordance with the ESIA report; coordinating the implementation of the ESMP by the contractor, The cost of standard construction mitigation measures have been integrated into the Project's Bills of Quantities. The overall (all transmission line of 451 Km) provisional sum for the total project cost for environmental mitigation and monitoring, the HIV/AIDS campaign and compensation and resettlement is currently estimated at US\$ 13,699,679 and this is summarized as follows:

RAP Compensation	USD 12,949,679
HIV/AIDS Campaign	100,000
Social Responsibility	150,000
Conservation Measures	200,000
ESMP Management and Monitoring	300,000
<b>Provisional ESMP + RAP Total</b>	<b>13,699,679</b>

## 10. Monitoring Program

10.1 The overall objective of environmental and social monitoring is to ensure that mitigation measures are implemented and that they are effective. Environmental and social monitoring will also enable response to new and developing issues of concern. The activities and indicators that have been recommended for monitoring are presented in the ESMP. Environmental monitoring will be carried out to ensure that all construction activities comply and adhere to environmental provisions and standard specifications, so that all mitigation measures are implemented. The contractor shall employ an officer responsible for implementation of social/environmental requirements. This person will maintain regular contact with KETRACO and KPLC's Environmental Management Units and the local District

Environmental Officers. The contractor, KETRACO and KPLC have responsibility to ensure that the proposed mitigation measures are properly implemented during the construction phase. Monitoring will be undertaken at a number of levels. Firstly, it should be undertaken by the Contractor at work sites during pre-construction, construction, under the direction and guidance of the Supervision Consultant who is responsible for reporting the monitoring to the implementing agencies. The following aspects will be subject to monitoring:

- Encroachment into protected and sensitive areas
- Vegetation maintenance around project work sites, workshops and camps
- Works safety elements, including a log of accidents
- HIV/AIDS program implementation
- Resettlement and compensation implementation

### ***Internal Monitoring***

10.2 It is the responsibility of KETRACO in collaboration with KPLC to conduct regular internal monitoring of the project to verify the results of the Contractor and to audit direct implementation of environmental mitigation measures contained in the ESMP and construction contract clauses for the Project. KETRACO and KPLC will also have the direct responsibility to implement and monitor land acquisition and compensation issues as outlined in the RAP. Their Project teams will have to include an environmental monitoring and management specialist as well as a sociologist experienced in land acquisition and compensation issues. The monitoring will be a systematic evaluation of the activities of the operation in relation to the specified criteria of the condition of approval. In undertaking the same, KETRACO and KPLC through KRU will be responsible for implementing resettlement and compensation activities and it will therefore be their responsibility to undertake regular internal monitoring of the process. The objective of internal monitoring and audit will be:

- (i) To find out any significant environmental hazards and their existing control systems in force.
- (ii) Meeting the legal requirements as stipulated in the Environmental Management & Coordination Act, EMCA-1999.

The responsibility for mitigation monitoring during the operation phase will lie with the Environmental Sections in KETRACO and KPLC.

### ***External Monitoring and Evaluation***

10.3 An independent consultant will be hired to carry out Annual Environmental Audits in line with NEMA requirements. NEMA has the overall responsibility for issuing approval for the Project and ensuring that their environmental guidelines are followed during Project implementation. Its role therefore is to review environmental monitoring and environmental compliance documentation submitted by the implementing authorities and they would not normally be directly involved in monitoring the Project unless some specific major environmental issue arose. KETRACO through the consultant will therefore provide NEMA with reports on environmental compliance during implementation as part of their annual progress reports and annual environmental auditing reports. Depending on the implementation status of environmentally sensitive project activities, NEMA will perform annual environmental reviews in which environmental concerns raised by the project will be reviewed alongside project implementation. The Bank's project Team will receive regular progress reports on implementation of the ESMP and conduct on the spot checks during supervision and implementation support. The project affected persons and communities will be represented through relevant project committees and public participation forums to be held during the audits.

## 11. Public Consultations and Public Disclosure

11.1 Community participation and consultation were undertaken among people living along the proposed transmission line corridors and area of influence as an integral part of the ESIA study. These meetings enabled interested and affected parties to express their concerns (views and opinions on the proposed development) in addition to those presented during the scoping exercise. A synopsis of views of the project affected people as well as representatives of the Local Councils in the districts through which the project traverses were presented and incorporated in predicting impacts and the development of the ESMP. Close attention was paid to persons within the proposed wayleave trace. The views of these stakeholders were considered and their names, identification numbers and contacts were taken for future references as required by NEMA. Comprehensive public participation meetings were held with various Chiefs, Assistant Chiefs, Village elders and respective persons who will be affected by the project along the wayleaves trace. The lists of those who were contacted have been presented in respective annexes to the ESIA reports.

11.2 The following are the important issues raised by various stakeholders and affected communities and persons:

- (i) Type and extent of damage to property and agricultural produce.
- (ii) Legibility for compensation
- (iii) Agreements on mode of compensation
- (iv) Adequacy and timeliness of compensation
- (v) How would the communities benefit directly
- (vi) How would the lines affect farming and grazing land
- (vii) What would be rates used for compensation
- (viii) Concern over health and safety
- (ix) Concern over scarcity of alternative land
- (x) Avail job opportunities during construction
- (xi) Access to electricity by local populations
- (xii) Concern over loss of fertile land
- (xiii) Concern over rapid rate of deforestation

### **Public Disclosure**

11.3 Disclosure of the ESIA and RAP reports was guided by EMCA 1999 law. This requires that the reports be advertised in local daily papers for a limited period, placing the documents at strategic positions within the Routes of Traverse where they can be accessed by potentially affected people. In keeping with the tradition established by NEMA, the RAP reports should be disclosed alongside the ESIA reports in designated locations as follows:-

- The NEMA headquarters in Nairobi,
- Provincial Directorates of Environment for the affected provinces,
- The District Environmental Offices in all affected districts,
- Where necessary public hearings would have to be organized at the direction of NEMA.

## 12. Complementary Initiatives

12.1 Living up to its expectations, KPLC and (and future KETRACO) will implement some projects as social corporate responsibility whereby they should assist the communities living in the project areas in activities like re-vegetation, supply of clean

drinking water and rural electrification program.

**12.2 Conservation Measures:** The project has included in its design planting of trees to replace those that will have been cut down and as an effort to reverse the high rate of deforestation. The program will be implemented in collaboration with the Kenya Forestry Service who have forestry offices and nurseries in all districts. Recommended types of trees will be determined by the Forestry Offices. The program shall be community based and accompanied by awareness and sensitization programs in preservation of the environment.

**12.3 HIV/AIDS Activities:** The project has included in the design implementation of HIV/AIDS and STI Awareness and Prevention Campaigns along the line routes for both contractor workers and communities in zone of the project. There will be a review mid-term of likely effectiveness of the approach and methods adopted in case new approaches and strategies are deemed appropriate. The activities will thus be re-oriented as necessary to achieve their full potential in lasting benefits to project affected communities by the end of the project.

### **13. Conclusion**

13.1 From the assessments carried out, it has been established that almost all potentially negative impacts of the proposed project can be minimized if not fully prevented by implementing recommended mitigation measures. The different alternative alignments have been reviewed and selected on the basis of environmental and social considerations, among others. The ESMPs have been developed whose pursuit can greatly improve the overall net effect of the project. The ESAs have observed that the bulk of adverse impacts will manifest at the Construction stage in which case, the core effort in mitigation will be concentrated in the contract for construction. It will hence be required that the ESMP be integrated into the Design Report with appropriate allocation of funds in the Bills of Quantities. The contract for construction should bear clauses binding the contractor to implement impact mitigation as part of the civil works. The KETRACO will hire competent supervising engineers through which compliance monitoring will be effected. As well, the KPLC and KETRACO in capacity of employer will mount own internal monitoring to ascertain environmental and social sensitivity at all stages of project development.

13.2 Development of the project will adhere to all applicable laws in Kenya and will also comply with AfDB Policies and Guidelines on safeguards. Towards this, the ESIA and RAP reports will have to be disclosed both locally and at the AfDB Public Information Center and Kenya Field Office. The project will be subject to statutory annual audits under EMCA 1999 and other statutes.

## References and Contacts

1. ESIA and RAP: Proposed Transmission Line 132 kV: Lessos-Kabarnet-Nyahururu-Nanyuki, Africa Waste and Environment Management Centre, (Kenya Power and Lighting Company Limited), March 2010.
2. ESIA and RAP: Proposed Transmission Line 132 kV: Olkaria-Narok-Bomet-Sotik and Kisii-Sondu, LOG Associates, (Kenya Power and Lighting Company Limited), November 2009.
3. ESIA and RAP: Proposed 132 kV Transmission Line: Nanyuki-Meru, Ishiara-Kieni, Mwingi-Kitui-Wote-Sultan Hamud, RepCon Associates, (Kenya Power and Lighting Company Limited), April 2010.
4. Environmental and Social Assessment Procedures (ESAP)", African Development Bank, 2001.
5. "Policy on Involuntary Resettlement", African Development Bank; 2003.

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## **ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) SUMMARY ANNEX**

### **SUMMARY RESETTLEMENT ACTION PLAN (RAP)**

**Project Name:** Electricity Transmission Improvement Project  
**Country:** Kenya  
**Project Number:** P-KE-FAO-004

#### **Preamble**

The Kenya Power and Lighting Company and thereafter the Kenya Electricity Transmission Company have embarked on a power transmission improvement program which will inevitably cause some negative impacts including those that will necessitate people being resettled and properties and services relocated. The program had anticipated financing from World Bank at the time of doing the feasibility studies. As a result, Resettlement Action Plans for all the lines have been prepared with World Bank policies and guidelines; and Kenyan local legislations. The aim of the RAPs was to assess the potential social impacts (positive and negative) of the proposed lines. In addition the RAPs will deal with social issues related to land acquisition, such as loss of economic activities and livelihoods or resettlement due to project implementation.

The underlying principles in the preparation of the RAPs require that (i) Involuntary resettlement should be avoided or minimized where feasible; (ii) if feasible, resettlement activities should be conceived and executed as sustainable development programs where the Project Affected Persons (PAPs) share in project benefits; (iii) displaced persons should be fully consulted and have opportunities to participate in planning and implementing resettlement programs; and (iv) displaced persons should be assisted in their efforts to improve their livelihoods and standards of living or at least to restore them, in real terms, to pre-displacement levels or levels prevailing prior to beginning of project implementation whichever is higher.

#### **1. Description of Project and Project Area**

1.1 The project consists of construction, on a turn-key basis, of a total of 451 km of 132 kV line and extension of six substation bay and construction of eight new 132/33 kV substations. The 132 kV transmission lines considered under the project financing are 53 km Ishiara – Embu, 65 km Lessos-Kabarnet, 79 km Nanyuki-Nyahururu, 68 km Olkaria-Narok, 33 km Sotik-Bomet and 160 km Mwingi-Kitui-Wote-Sultan Hamud. Eight 132/33 KV new substations will be constructed at Kieni, Kabarnet, Nyahururu, Narok, Bomet, Kitui, Wote and Sultan Hamud with six 132 kV outgoing bays at Ishiara, Lessos, Nanyuki, Olkaria, Sotik and Mwingi.

#### **2. Potential Impacts**

2.1 The project will traverse a long stretch of land with considerable levels of mitigable impacts to the flora and fauna. There are also impacts which will be socio-economic in nature especially during the construction phase that need mitigating interventions as provided for in the ESIA report. Most notable will be disruption to residential, commercial and institutional buildings, loss of cultivation land, trees and crops. Over 798 households will be affected in one way or the other representing over 1878 persons involved. The table below gives a summary of the impacts.

T/Line	# of Structures	# of Households	# of PAPs
Lessos – Nyahururu	474	113	521
Olkaria – Sotik	180	91	637
Kisii – Sondu	2000	849	4245
Mwingi – Sultan Hamud	103	296	399
Ishiara – Kieni	23	298	321
<b>Total</b>	<b>2780</b>	<b>798</b>	<b>1878</b>

It should be noted that the Transmission line sections of Olkaria - Sotik and Ishiara – Kieni have no resettlement requirements, respectively.

2.2 This notwithstanding, the construction of the upgrading of the transmission lines will enhance power supply to the various towns and villages hence improve the standard of life and socio-economic welfare in these areas. It is anticipated that the lines will lead to a more reliable supply of power to project area and the vicinity. This will have a positive impact on the economy in general as businesses will substantially increase in the area and in the country as a whole. Among the positive outcomes during construction are the increased opportunities for direct employment, and also ad hoc businesses in catering, hospitality and supplying of materials and services to the construction firms and employees.

### 3. Organizational Responsibility and Implementation of the RAP

3.1 As the case is, KPLC took responsibility of formulating and supervising the feasibility studies. The situation has changed such that there is the creation of KETRACO. A Memorandum of Understanding (MoU) has been drawn up between KPLC and KETRACO on how to manage the transitional period. In terms of compensation and resettlement, the overall responsibility, just like in the ESMP, will lie with the project sponsor, KETRACO and KPLC will provide logistical support and guidance. The project is under the administrative authority of the Ministry of Energy. Policy and strategic decisions involve the following Ministries:

- Ministry of Finance
- Ministry of Environment and Natural Resources
- Ministry of Lands and Settlement (Physical Planning Department)
- Ministry of Roads, Public Works and Housing
- Ministry of Agriculture
- Ministry of Local Government.

The Local Authorities in the respective project districts and regions will also be involved in the RAP implementations and ensure timely execution of the whole process.

3.2 After assessing and determining the characteristics of all project affected persons (PAPs), the valuation of assets to be compensated and preparation of the complete list will be the responsibility of KETRACO and KPLC. KPLC has acquired enormous experience during the RAP implementation of the World Bank financed Energy Sector Recovery Project and the multi-donor financed Mombasa-Nairobi transmission line.

The implementation times will be pegged on the following process

- (i) KRU is constituted
- (ii) PCs are constituted
- (iii) PCs sign off on the RAP. This constitutes KETRACO and KPLC acceptance of the terms of the RAPs.

- (iv) KETRACO and KPLC draw up offer documents for PAPs
- (v) The affected people review the offers made and enter into agreements with KETRACO and KPLC
- (vi) The PAPs identify alternative sites and move to them
- (vii) Monitoring of the “willing buyer - willing seller” affected people begins

#### **4. Consultations with the Public and Local Authorities**

4.1 Communication and dialogue with stakeholders including PAPs is very critical for a successful Resettlement and/or compensating program. As such it is planned to continue with consultations until implementation of the RAPs is completed. During the preparation of the RAPs, therefore, the consultant undertook an extensive consultation with the PAPs and so did KPLC. During the consultations, the communities were encouraged to (i) be open and make known their concerns and claims; (ii) be free to access the formally established grievance process for lodging Complaints; and (iii) allow and give the necessary assistance to the M&E team. During finalization and preparation of the payment schedules and actual payment, KETRACO and KPLC personnel would continue to conduct a series of consultations and counselling.

4.2 During the consultations, the issues that rose concerning the project were discussed. Generally the public was not resisting the project apart from a few cases where interviews with potentially affected persons were not done since it wasn't easy to identify them before the surveys are completed. The public also feared that they would be relocated to agriculturally unproductive land. In such cases, it was recommended that factors like land productivity and climate be considered when identifying alternative land and when compensating for lost land. The public also expressed their dissatisfaction with KPLC's poor history in terms of compensation. This situation will be ameliorated through inclusion of appropriate covenants in the loan documents. Most of the respondents resisting the project were of the opinion that they will not benefit much from the project. As a way of response, the project will ensure that most of the unskilled jobs should be offered to communities living in the project area. In addition, through the rural electrification program, communities will benefit from the improved power supply. The general concern of delayed compensation and undervaluing of the structures, land and crops was aired by the PAPs. This can lead to grievances and possible compulsory acquisition of the land by the government.

#### **5. Institutional and Legal Framework**

##### ***Institutional Framework***

5.1 The implementation of the RAPs shall call for collaboration from all the stakeholders. This has meant a properly constituted structure for its administration. The roles and responsibilities have been elaborated for various stakeholders in the implementation and administration of the RAPs. It has further clarified the role of PAPs and their responsibility in the entire exercise. Since KPLC will take responsibility of executing the RAPs, a unit, KPLC Resettlement Unit (KRU) has been set up. It should be noted that KETRACO will emulate these structures for handing over of responsibilities at the appropriate time. The structure of KRU shall be as follows: Legal Advisor, Surveyor, Transmission Engineer, Socio-Economist, Way-leave Officer, Environmental Expert, KPLC accountant, Community Liaison Officer, Database Officer, and KPLC registered valuer

5.2 The KRU will be responsible for the following:

- i. Oversee the implementation of the RAPs.
- ii. Oversee the formation of PAP Committees (PC)

- iii. Ensure maximum participation of the affected people in the planning of their own resettlement and post resettlement circumstances
- iv. Accept financial responsibility for payment or compensation and other designated resettlement related costs.
- v. Ensure detailed valuation of the structures in order to determine the case to case value of each component of the project and agree upon a value for compensation.
- vi. Pay the PAPs compensation in the amounts agreed.
- vii. Ensure monitoring and evaluation of the PAPs and the undertaking of appropriate remedial action to deal with grievances and ensure that income restoration are satisfactorily implemented.
- viii. Ensure initial baseline data is collected for the purpose of monitoring and evaluation reports as per the indicators provided by the RAPs.

5.3 Under the guidance and coordination of KRU, the PAP Committees (PCs) will be formed which will act as a voice for PAPs. Each of the committees shall comprise the following:

1. National Environmental Management Authority (NEMA) officer
2. Lawyer, KPLC/KETRACO
3. Valuer, KPLC/KETRACO
4. Two Project affected people Representatives – to be appointed by PAPs
5. Local council representative
6. District Valuer or any Independent Valuer
7. Surveyor
8. The local area chiefs
9. District Land Adjudication and Settlement Officer
10. District Social Development Officer
11. Provincial State Counsel

5.4 The PC will be concerned with (i) public awareness (concerns, interests and grievances); (ii) compensation (rates, resettlement process), (iii) monitoring and evaluation, (iv) logistics, and (v) employment, training and counselling. In the cases for the transmission lines, the KPLC through the Wayleaves Section will then prepare a wayleaves agreement showing the specific affected plot, the proposed route and proposed compensation (calculated by the KRU) for the anticipated losses. The agreement will also contain all the public safety requirements that the owner is supposed to adhere to. The landowner will be requested to give consent once she/he is satisfied with the agreement. Compensation will be made to both the affected persons who are currently using the land as well as the registered owners. The KRU will monitor the payments made.

### ***Legal Framework***

5.5 Absolute or complete ownership of land in Kenya can be said to be in the state. The power of the state to qualify (extinguish) property rights in the public interest is embodied in Section 75 of the Kenyan Constitution. The section however makes the exercise of that power subject to due process of law. Section 117 of the Constitution further provides that an Act of Parliament may empower a county council to set apart trust land for (i) the use and occupation of any public body or authority for public purposes; (ii) prospecting or mining purposes; and (iii) the use and occupation of any person or persons for a purpose that is likely to benefit the residents of the area.

5.6 All land in urban areas of Kenya and much of the land in rural areas has a registered title. The title to land is either freehold or leasehold. The development and use of freehold title is controlled by land planning regulations which are administered by both the Central

Government and the Local Authority in which the Land is situated. (A Local Authority is either a County Council or Municipal Council whose activities are established and controlled by Local Government Legislation).

5.7 In Kenya expropriation is provided for in the Constitution under section 75 for private land and sections 117 and 118 for unregistered Trust Land. But the constitution only gives general guidelines. The detailed procedures for acquisition are elaborated under the “Land acquisition Act” in chapter 295 for private land and chapter 288 for unregistered Trust Lands. “Trust Land” refers to that land that is still held under African customary tenure. The title to this land is said to vest in the County Council in trust for its inhabitants, hence the term “Trust”

5.8 Preparation of the RAP has taken into consideration all the relevant laws and by-laws in Kenya and is consistent with safeguard policies of the International Financial Institutions such as African Development Bank (AfDB) and the World Bank.

## **6. Grievance Redress Mechanism**

6.1 Grievance redress mechanisms are essential tools for allowing affected people to voice concerns about the resettlement and compensation process as they arise and, if necessary, for corrective action to be taken expeditiously. Such mechanisms are fundamental to achieving transparency in the resettlement process. Disputes will be referred to KPLC and KETRACO; and if necessary, the PAP Committee (PC) may be asked to provide recommendations as to how the concern can be addressed. If deemed necessary by the PAP Committee, the case may be re-investigated and, depending on the nature of the issue, referred to the National Environmental Tribunal or Public Complaints Committee (Grievances). Information about all disputes and grievance procedures is to be widely disseminated, through consultation forums, Chief Barazas and the Media. The PAPs committee secretary or nominated agent (in the absence of the secretary) will keep a written record of all disputes/grievances raised and dealt with during the resettlement and compensation process. These records will be monitored regularly by the PAPs Committee and by the Independent Monitoring Team (IMT). This will be undertaken as part of the on-going monitoring and evaluation process.

6.2 The PC, for specific districts affected by the project, shall comprise 2 representatives of the PAPs, the area District officer, area chief (s), 2 KPLC/KETRACO staff from the Way-leaves and Property sections. The tasks of this committee will be to receive and verify information concerning grievances. They will not handle or rule on disputes. The grievances that they will review will include non fulfilment of contracts, levels of compensation, or seizure of assets without compensation.

6.3 In summary, once an affected party declares a grievance, KPLC/KETRACO hears the grievances and rules. PAP committee has 2 weeks from submission to respond. If the grievance is not resolved, then Land Compensation Tribunal, Public Compliant Committee reviews the case. If still not resolved, then PAP may opt for legal action in court.

## **7. Valuation of Assets and Losses**

7.1 Legally acceptable valuation procedures that are accepted by both the Government of Kenya and AfDB, will be applied for purposes of fairness and consistency. This will consider replacement costs as well as types and levels of compensation under the Kenya law. Valuation of lost assets will be made at their replacement cost. The approach involves direct replacement of expropriated assets and covers an amount that is sufficient for asset

replacement without depreciation, moving expenses and other transaction costs. The table below summarises the valuation processes to be followed.

### Valuation Process Relevant to RAP

Assets	Process
Land with Structures	<p><b>Steps:</b></p> <ol style="list-style-type: none"> <li>A detailed inventory of all persons, possessions, assets and stock requiring resettlement will be made.</li> <li>Accurate and real valuation of dwelling will be taken.</li> <li>Determine compensation packages according to valuations will be carried out.</li> <li>Allow a reasonable time period prior to moving, for salvage of building materials. PAP's may salvage any material without this being deducted from compensation entitlements.</li> <li>Provide temporary housing/shelter if necessary.</li> </ol> <p><b>Recommendations:</b></p> <ol style="list-style-type: none"> <li>KETRACO/KPLC will pay compensation for the lost housing structures.</li> <li>KETRACO/KPLC will provide transport for the occupants and their belongings to their new place of residence.</li> <li>The owner will be entitled to remove any materials he or she wishes to salvage within one month of vacating the old dwelling.</li> <li>KETRACO/KPLC will provide transport for these materials, other than masonry, to the new residential site.</li> </ol>
Land without structures	<ol style="list-style-type: none"> <li><b>Inventory:</b> As part of the RAP phase the KPLC hopes to acquire names and contact details of all persons affected by the project.</li> <li><b>Compensation:</b> The RAP data sheet spells out how each person is affected and indicates how much compensation will be paid for crops and trees lost.</li> </ol>
Lost business profits and employee earnings	<ol style="list-style-type: none"> <li>Where business profits may be affected compensation will be paid according to Valuation &amp; Audited results of the enterprises monthly income.</li> </ol>
Crops/Trees on the fields cultivated by those affected.	<ol style="list-style-type: none"> <li><b>Tree/seasonal crops:</b> Harvesting of the crops will be given a first priority but where harvesting is not possible, counting of the affected crops will be done by a registered valuer and KPLC agent in the presence of the owner. Computation of the costs will be done according to market rates and payments thereafter made either at KPLC offices, or through the local chief's office.</li> <li><b>Annual crops:</b> Crops will be harvested by the owner and therefore no compensation will be paid for crops. In instances where crops are not able to be harvested, KPLC will pay compensation at the market rates.</li> </ol>

## 8. COMPENSATION AND ENTITLEMENTS

8.1 Consistent with the AfDB Policy on Involuntary Resettlement, affected persons, irrespective of their legal status are eligible for some form of compensation if they occupied the land before the entitlement cut-off date which is the date when the assessment of persons and their property in the project area was carried out. The key determinant for compensation is on the basis of a pre-project census during which all residents were identified. Replacement costs have been categorized separately from houses, structures, crops and trees. Resettlement will not necessarily require (except by choice of the PAP) relocation to another village or area. In most cases the PAPs will chose to step back within

their compounds. The Physically Displaced Persons will be allocated alternative sites and/or given materials to replace their structures affected by the project. The PAPs will be informed of the different options available during the disclosure process. The vulnerable PAPs will receive special assistance in establishing replacement homes.

8.2 Compensation and entitlements will be triggered by particular and specific impacts resulting from the project. Using a holistic approach, these general impacts emanating from the project would include losses at family and community level (public assets, commercial assets, and communal assets). Losses will mainly fall into the following categories:

- Loss of assets (structures and agricultural land)
- Loss of livelihood
- Loss due to severance

**Category 1 Structures:** Those who will lose all structures such as residential, kiosks, stalls, etc and have acquired relevant license; those who will lose some part of their structures such as residential, kiosks, stalls, etc and have acquired relevant license; those who will lose all structures such as residential, and have not acquired relevant license; and those who will lose some part of their structures such as residential, kiosks, stalls, etc and have not have acquired relevant license e.g. Temporary Occupation License.

**Category 2 Agricultural Land:** Those who will lose all land and have titles; those who will lose partial land and have titles; those who will lose all land and have no titles; those who will lose partial land and have no titles; those who will lose all trees; those who will lose part of their trees; those who will lose all field crops; and those who will lose part of their field crops.

**Entitlement Matrix:** The Kenyan law recognizes compensation for loss of property due to implementation of development projects. The law includes houses, crops and trees. It also recommends a fair compensation for loss of property. The government has established a compensation principle, and that is, compensation for loss of property is paid at market value. Property loss falls under four categories namely property owners, business tenants, residential tenant, encroachers (using land) and squatters.

## 9. Costs and Budget

9.1 The right to benefits will only be granted to PAPs whose assets will be demolished and those who will have to move their assets to a different location. KETRACO/KPLC will use prevailing market rates for land structures and trees as practiced by the international valuation standards committee (2008) rules and The Institution of Surveyors of Kenya valuation rules. KPLC also has a policy that ensures that any cut or uprooted vegetation is left for owners use after compensation. Assets that are not vegetative would require valuation before compensation and resettlement. An estimate of the replacement costs of the structures to be demolished along power lines construction for entire project shall be carried out by licensed valuers, appointed by KETRACO/KPLC for the exercise. It is from this that the compensation amount of the affected households will be determined.

9.2 All compensation activities and those related to other forms of assistance including disturbance allowance, and any other associated activities that may be necessary have been costed. The compensation and implementation/monitoring cost for the RAP are approximately Ksh 1,010,075,000 (USD 12.950 million). Resettlement/Compensation (RAP) estimates for compensation are based on engineering and initial PAP surveys conducted by the Study Teams. Various alternatives were considered with the best options which minimized resettlement and destruction to property were selected. The table below gives a summary of the cost estimates so far generated in Ksh.'000.

Item	T/Line	Structures	Disturbance Allowance	Land Cost	Tress	Total
1.	Lessos-Nyahururu	63,925	9,589	395	20	73,929
2.	Olkaria – Sotik	30,000	4,500	69,750	3,488	107,738
3.	Kisii – Sondu	300,000	45,000	13,680	684	359,364
4.	Mwingi– Sultan Hamud	196,953	29,543	109,393	46	335,935
5.	Ishiara – Kieni	77,746	11,662	42,557	1,144	133,109
<b>6.</b>	<b>Total</b>					<b>1,010,075</b>

9.3 Detailed RAPs are still being developed following thorough surveys which are underway, and an actual cost of resettlement actions will then be obtained. In the current situation, compensation estimates closely followed the guidelines stipulated in the KPLC's Resettlement Policy Framework developed in March 2008 under the Power Sector Recovery Project, Additional Financing. KPLC is committed to implementing the RAP after approval of the plan.

## 10. Monitoring and Evaluation

10.1 The purpose of monitoring and evaluation is to report on the effectiveness of the implementation of the RAP, covering physical resettlement, disbursement of compensation and effectiveness of public consultation, amongst others. The Ministry of Energy will ensure that all aspects of RAP have been adequately and expeditiously executed according to the implementation plan. The monitoring will cover the review of survey results, formation of relevant committees (including the Grievance Committee), the identification of alternative land for resettlement and farming, adherence to compensation payment schedule, movement and support of project affected persons including the vulnerable households. A plan for monitoring and evaluation of the compensation package has been drawn up with indicators for measuring implementation performance, impacts and outcomes. A review of regular progress reports produced by KETRACO and KPLC will be carried out by all stake holders both at national and local levels including the AfDB.

### *Internal Monitoring*

10.2 The responsibility of internal monitoring the operation performance of the resettlement and compensation through KRU will be the shared responsibility of KETRACO and KPLC. The monitoring will Have to be a systematic evaluation of the activities of the operation in relation to the specified criteria of the condition of approval. The objectives of internal monitoring and supervision will be (i) to verify that the valuation of assets lost or damaged, and the provision of compensation, resettlement and other rehabilitation entitlements, has been carried out in accordance with the resettlement policies provided by the GOK and AfDB Policies and guidelines; (ii) to oversee that the RAPs are implemented as designed and approved; (iii) to verify that funds for implementation of the RAP are provided for by the Project authorities in a timely manner and in amounts sufficient for their purposes, and that such funds are used in accordance with the provisions of the RAP.

10.3 The main internal indicators that will be monitored regularly include: (a) that the KETRACO/KPLC's entitlements are in accordance with the approved policy and that the assessment of compensation is carried out in accordance with agreed procedures; (b) payment of compensation to the PAPs in the various categories is made in accordance with the level of compensation described in the RAPs; (c) public information and public consultation and grievance procedures are followed as described in the RAPs; (d) relocation and payment of subsistence and shifting allowances are made in a timely manner; and (e) restoration of affected public facilities and infrastructure are completed prior to construction.

### ***External Monitoring and Evaluation***

10.4 The project proponents recognize the importance of engaging an independent monitoring unit (IMU) to be established to evaluate implementation of compensation and resettlement. In establishing the IMU effort should be made to draw on personnel with resettlement and social development experience. The IMU shall be appointed to monitor the resettlement and compensation process and implementation of requirements to verify that compensation, resettlement and rehabilitation have been implemented in accordance with the agreed RAPs. The IMU will also be involved in the complaints and grievance procedures to ensure concerns raised by PAPs are addressed.

10.5 The RAPs will mainly be implemented by KPLC. The M&E will be carried out by the KRU and PC. The KRU will be responsible for the overall M&E while the PC will monitor and evaluate respective communities where they will have been formed. Hence the IMU will carry out the following (i) review the results of the internal monitoring and review overall compliance with the RAPs; (ii) assess whether relocation objectives have been met especially with regard to housing, living standards, compensation levels, etc.; (iii) assess general efficiency of relocation and formulate lessons for future guidance; (iv) determine overall adequacy of entitlements to meet the objectives; and (v) provide a forum for skills-sharing and to develop institutional capacity. The AfDB will monitor the operation through regular reports and supervision missions.

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